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Assessing the Effect of Aromatherapy on Fundamental Nursing Student Cognitive Test Anxiety:
A Mixed Methods Approach.

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Research Assistant

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Capstone

Southern Adventist University

School of Nursing

Chapter I

Introduction

Description of the Problem

The researcher was first exposed to aromatherapy in the labor and delivery unit of the hospital. All the nurses on the labor and delivery unit, as well as the mother baby unit, had to be educated on essential oil use. The in-service entailed which oil to use for certain complaints from the patients, how to combine the oils for aromatherapy, and safety practices when using the oils. One symptom that is often noted in labor and delivery is anxiety. Nurses have the capacity to create a less stressful infant delivery experience for the patient and the family by keeping the patient's anxiety level low.

Anxiety can present itself in many other environments, including test anxiety. Nurse educators who recognize test anxiety can have a significant influence on a student's anxiety by early intervention and implementing other strategies (Shapiro, 2014). A study conducted by Johnson (2014) indicated that the use of aromatherapy prior to testing decreased a student's test anxiety while simultaneously facilitating student's cognitive recall during a test. Thirty percent of nursing students have negative test outcomes related to anxiety (Shapiro, 2014). According to extensive research by Bembenutty (2008), "Test anxiety negatively influences student's effective use of information processing by interfering with their ability to retrieve information. Worry limits cognitive capacity so that less of it remains available for remembering and thinking" (2008). Test anxiety is a problematic occurrence that effects students' academic outcomes.

Background

Test anxiety alters the student's ability to process and recall information which negatively impact academic performance. The student encountering test anxiety experiences an interference with attention, concentration, and cognitive recall (Bembenutty, 2008).

Bembenutty's (2008) research discovered that "test anxiety may interfere with how students use effective Cognitive strategies such as elaboration, rehearsal, and organization" (p.124).

Moreover, test anxiety can result in hindering the student's expectancy for success and negatively impact learning outcomes. The reason that this occurs is because there is an inability to concentrate and an interruption in the capacity to recall the test material. Tobias (1985) further connected test anxiety with the term worry, describing it as a retrieval deficit of information which distracts the learners' attention, and impairs the student's ability to perform specific tasks.

Researchers Bembenutty (2008) and Tobias (1985) both concurred that test anxiety is a common problematic occurrence across academia. However, Tobias posited that even the most prepared student has a higher incidence of test anxiety and thus test anxiety interventions should be implemented regardless of the student preparedness (1985). A seminal study by Johnson (2014) took the research by Bembenutty and applied it to sophomore nursing students with the intent to discover if aromatherapy could decrease the level of nurse test anxiety.

The research outcome from Johnson (2014), Bembenutty (2008), and Tobias (1985) should motivate educators to develop teaching strategies which may decrease test anxiety while enhancing a student's academic performance.

Definition of Terms

Test Emotionality

- Conceptually: The physiological reaction triggered by stress.
- Operational: The observation of the stress symptoms resulting from the stress trigger.

Theoretical Framework

Hans Selye designed the General Adaption Syndrome (GAS) theoretical model which focused on stress response (Nursing Theories, 2011). Stress is a state caused by a vicissitude in the environment, and the nature of the stressor is unpredictable (Nursing Theories, 2011).

According to the GAS model, the body goes through three stages of coping.

Stage one is the alarm stage. This is the fight or flight response to a stimulus in the sympathetic nervous system where the body's hormonal defenses, cortisol and adrenalin, are activated in response to a threat (Nursing Theories, 2011).

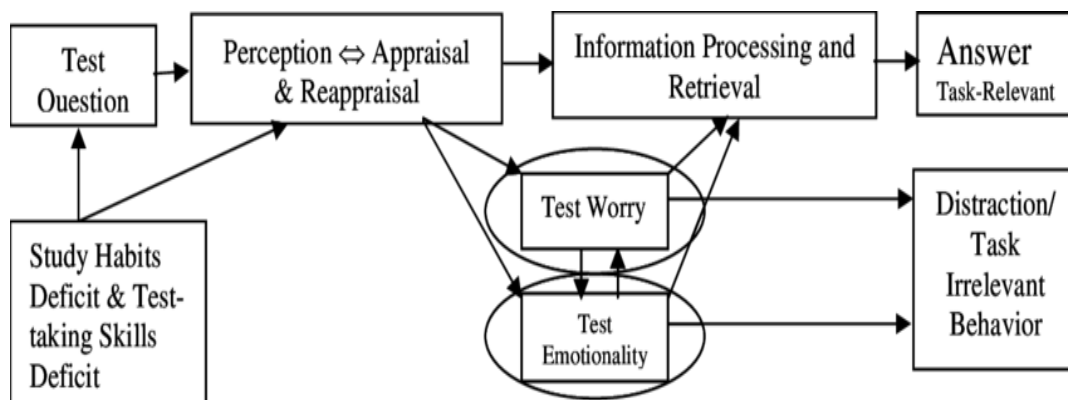
Stage two, the resistance stage, is a survival mechanism balanced between the body's own defense mechanisms. A parasympathetic response forms a balanced coexistence in which the body remains in a state of alert (Nursing Theories, 2011).

In Stage three, the exhaustion stage, stress continues beyond the body's capability to handle the stress. The body's resources are exhausted and becomes susceptible to disease and death (Nursing Theories, 2011).

Nursing theorist, Betty Neuman, was influenced by Seyle and connected her concept of stressors to ones' environment. Intrapersonal stressors exist within a person. Interpersonal stressors occur outside the person's control but have an impact on the person. Extrapersonal stressors are associated outside the control of the person; an example of an Extrapersonal stressor would be social media. (Nursing Theories, 2011).

Although Johnson (2014) used no theoretical framework in her research study the Transactional Process Model (TPM) process theoretically could be applied. Additionally, Johnson's (2014) research can be correlated to the GAS model as evidenced by the identifiable behaviors of stress associated with test anxiety among her sophomore nursing students. The TPM outlines a conceptual framework to explain the process that occurs when a student is confronted with stress or fear leading to anxiety producing behaviors because the body cannot tell the difference between real and conceptual stress and fear (Spielberger & Vagg, 1995).

In the initial stage of the TPM, the study habits and test taking skills of the student will be a relevant factor when confronted with a test question. Perception, appraisal, and reappraisal of the question are pondered. As a consequence, test worry and test emotionality have an effect on information processing and information retrieval. Under these circumstances the process will render a relevant answer or distraction that will lead to irrelevant behaviors. This will not allow the student to achieve positive test taking outcome.



Johnson (2014) recognized test anxiety as an impediment for the sophomore nursing students in reaching academic objectives. After investigating complementary and alternative therapies, Johnson (2014) decided that aromatherapy was safe to use as a strategy to decrease levels of test anxiety. This researcher posited that the introduction of aromatherapy to sophomore

nursing students in a test taking environment would demonstrate a decrease in stress caused by test anxiety. Furthermore, Johnson's research discovered that decreasing the stress of the test anxiety did improve cognitive recall and academic performance.

PICO and Purpose Statement

Will aromatherapy make a difference on student cognitive test anxiety among fundamental nursing students? The purpose of this literature review is to assess the effect of aromatherapy as a teaching strategy to decrease test anxiety and improve student cognition and academic performance.

Chapter II

Review of Literature

The databases and key words used for this research include: CINAHL Complete, aromatherapy anxiety, 32 articles; ProQuest, test anxiety, 534 articles; Google Scholar, aromatherapy exam anxiety, 939 articles; Google Scholar, aromatherapy for test anxiety nursing students, 10100 articles. The use of these key words filtered the relevant peer reviewed journals from the last five years to support the PICO question.

Presentation of Literature

Concept One: Academic Performance

Academic performance represents the accomplishments the student has achieved scholastically. Johnson (2014) sought a teaching strategy that would improve the grades of her sophomore nursing students. In two separate studies by Bembenutty, (as cited in Johnson, 2014) university students revealed that the ability to recall information is impacted by test anxiety, and therefore academic performance was compromised. Correspondingly, Naveh-Benjamin,

McKeachie, and Lin (1987) as cited in Bembenutty, (2008), stated “the ability to retrieve information was negatively affected in processing information due to test anxiety”.

Mccaffrey, Thomas, and Kinzelman, (2009), experimented with the use of two essential oils for aromatherapy to decrease test anxiety. Their research of previous uses for aromatherapy lead them to concentrate on the uses of two essential oils, lavender and rosemary. Historically, rosemary is believed to increase memory thus improving cognitive recall (Pengelly, Snow, Mills, Scholey, Wesnes, &Butler, 2012). Rosemary was used as incense and burned in universities and schools to inspire students (Pengelly, Snow, Mills, Scholey, Wesnes, & Butler, 2012).

In this study, researchers, Kavurmaci, Kucukoglu, and Tan (2015), identified test anxiety having a negative effect on nursing student’s academic performance before, during, and after a test. However, the research findings of aromatherapy and test anxiety did not demonstrate significant differences between the final test scores of the control group and the experimental group ($p>0.05$) who was exposed to aromatherapy.

These researchers concurred that the overpowering effects of anxiety can cause decreased efficiency of learning, depression, less motivation, and can be self-destructive. Moreover, there is a strong relationship between high levels of anxiety and learning outcomes (Hamilton, 1975, Kim 2010, Spielberger, 1966).

Likewise, this research, by Çevik, İnce, Ayceman, and Ergin explored nursing student stress during a return demonstration of intravenous injections for the first time. This laboratory experience was expressed as a highly stressful experience (2017). “While moderate level of anxiety is necessary for learning, high levels of anxiety result in decreases in learning” (Cevik, et al. (2017).

Concept Two: Student Test Anxiety

Test anxiety is defined as an apprehensiveness that over takes the student with a fear of failing any assigned task or test (test anxiety. n.d.). Regardless of the anxiety scale or assessment used the following studies readily identify that student anxiety is prevalent throughout academia.

Johnson's (2104) study focused on text anxiety without an intervention. This study used the Cognitive Test Anxiety Survey (CTAS) with an experimental group and the control group. Results indicated no significant differences between the experimental and control group. The recommendation from Johnson, (2014) suggested the importance of nursing educators to investigate inventive concepts such as aromatherapy to help reduce test anxiety in students.

In the study by Mccaffrey, Thomas, and Kinzelman, (2009), the Test Anxiety Scale (TAS) measured pre- and post-test mean scores and found no significant difference between the experimental group and the control group with no aromatherapy intervention. In addition, these authors discovered that the most widespread reasons nursing students give for low test grades are due to increased stress and anxiety associated with the required grade to successfully complete nursing courses. These students described symptoms related to test anxiety as: difficulty with memory recall, mental distraction, nausea, and diarrhea, headache, and heart palpitations.

Moreover, this study discussed two types of anxiety, trait anxiety and state anxiety Kavurmaci, Kucukoglu, and Tan, (2015). Trait anxiety refers to a permanent personality and characteristic condition, whereas state anxiety is a temporary emotional condition. To identify the level of anxiety of students, the researchers used the State Trait Anxiety Inventory 1 Test. The (STAI 1) scores were significantly lower in the experimental group than the control group ($p < 0.05$) after the intervention of aromatherapy.

One of the most anxiety inducing tasks for nursing students is their first blood draw practice. The first blood draw into a real body is very stressful and evokes high anxiety levels among nursing students Çevik, İnce, Ayceman, and Ergin, (2017). High anxiety levels resulted in a decline in performance. Three physiological indicators were used to measure anxiety, systolic blood pressure, diastolic blood pressure, and pulse rate. The Visual Analog Scale (VAS) and STAI reported subjective data. This study consisted of 72 first year nursing students equally divided in two groups; an experimental group and a control group. Prior to demonstrating an intravenous injection, the VAS and STAI forms were completed along with blood pressure and pulse rates. There was no significant difference in the VAS or STAI scores prior to the intravenous injection procedure. Since the results are not consistent with other studies, it is recommended that further studies be conducted with larger sample groups, various essential oils, and different aromatherapy methods.

In a study of nursing students' first intravenous injection experience, the subjective comparisons of gap between pre-test and post-test scores were statistically significant STAI ($p=.09$), VAS ($p=.04$) Kim and Hwangbo, (2010). However, with the aromatherapy intervention, test anxiety was lessened but there was a no noted change or improvement in performance.

A comparison essential oil study was conducted on 80 female students to evaluate the effects of aromatherapy on test anxiety. This study theorized that test anxiety is situational anxiety that can lead to a significant reduction in an individual's academic performance during a test (Bakhsha, Yousefi, Aryaee, Jafari, and Derakhshanpoor, 2016). To evaluate situational anxiety, Sarason Anxiety Test and the VAS questionnaires were used to categorize the anxiety levels of the female students. The students who scored as having a high level anxiety were chosen to

participate in the study. Anxiety levels of the female students had a significant drop in the anxiety questionnaire scores after the intervention of aromatherapy.

While test anxiety is defined as an apprehensiveness which is conveyed as a fear of failing, stress anxiety is also associated with medical diagnostics or coping in an unfamiliar environment, of which evokes anxiety symptoms that mirror test anxiety symptoms. Thus the interventions and treatments are similar (Cho, Min, Hur, and Lee, 2013, Sharifi, Motaghi, Borji, & Moradi, 2017, Tahmasbi, Mahmoodi, Mokhberi, Hassani, Akbarzadeh, & Rahnamai, 2012, Zahirunnisa, Gadagi, Gadde, Koneru, Myla, & Thatimatla, 2014).

A common metabolic disease in children is diabetes. Diabetes can be a burden for an adult but for a child diabetes significantly alters their quality of life. For school-age children with diabetes, benzodiazepines are often prescribed for the treatment of anxiety. This pharmacological intervention produces side effects including nausea, vomiting, and drug dependence. Anxiety in children is an unrealistic fear. The symptoms of anxiety can affect cognition, behaviors, and be expressed with emotional and physical symptoms. Sharifi, Motaghi, Borji, and Moradi (2017). A non-pharmacological approach would provide a lower risk for adverse side effects and drug dependence.

Dental anxiety can present a horrifying fear that can be detrimental to both patients and dental professionals. Zahirunnisa, Gadagi, Gadde, Koneru, Myla, and Thatimatla (2014). Dental anxiety is defined as an “abnormal fear or dread of visiting the dentist for preventive care of therapy and unwarranted anxiety over dental procedures (Zahirunnisa et, al., 2014)”. This type of anxiety can present itself as physiological and emotional behavioral indications, which can vary from nervousness to dental phobia. The most common form of treatment to manage dental anxiety is conscious sedation, and in severe cases, general anesthesia. Conscious sedation and

general anesthesia come with risks and there may be some patients who cannot take this treatment to decrease anxiety.

A leading cause of death among men and women of all races is cardiovascular disease. Invasive diagnostic procedures are used in the diagnosis of cardiovascular disease. One procedure used in the diagnosis of cardiovascular disease is coronary angiography. A study by Uzum states 74% of patient's experience anxiety prior to angiography, (as cited in Tahmasbi, et, al. (2012), The procedure raises anxiety levels which can impact the patient's physiological responses such as respirations, heart rate, blood pressure, myocardial oxygen consumption, irregular heartbeat, and plasma concentration of epinephrine and norepinephrine which places the patient at risk Tahmasbi, Mahmoodi, Mokhberi, Hassani, Akbarzadeh, and Rahnamai (2012). This study identified two types of anxiety. Overt anxiety is felt at a specific moment. Covert anxiety is a common feeling an anxious individual. According to the data, the overt and covert anxiety levels in the control group and the experimental group matched prior to the aromatherapy intervention. The experimental group anxiety levels were lower after exposure to aromatherapy.

This study examined effects of aromatherapy on anxiety in an Intensive Care Unit (ICU). Hospitalization related to a cardiac diagnosis causes increased stress and anxiety. These cardiac complications can lead to myocardial infarction or arrhythmias Cho, Min, Hur, and Lee, (2013).

Nursing interventions to decrease anxiety in an intensive care unit would prove beneficial to cardiac patients. The reason of this inquiry was to explore the effects of aromatherapy use on anxiety of percutaneous coronary intervention patients with ischemic heart diseases with stent placement during coronary angiography who were admitted to an intensive care unit. The hypothesis was clearly defined in the article. There were 28 patients in the aromatherapy group and 28 patients in the control group Cho, Min, Hur, and Lee. (2013).

Concept Three: Aromatherapy

Therapeutic utilization of plant-derived aromas which are inhaled to promote physical and psychological well-being is called aromatherapy. The nursing students was exposed to the diffused lemon oil for 15 minutes prior to a test in order to receive the maximum benefit of the aromatherapy in decreasing anxiety. There was a significant decrease in the students' Cognitive Test Anxiety Surveys ($p=0.01$). In a review of literature, aromatherapy was linked to causing anxiolytic effects. For this reason, Johnson (2014) used it as an intervention to decrease test anxiety states in her nursing students while improving their academic performance.

Mccaffrey, Thomas, and Kinzelman, (2009), concentrated on the use of lavender and rosemary to decrease test anxiety in a graduate nursing program. Both scents were significant in reducing stress and anxiety. Lavender was relaxing, but caused the students focus to decrease. Rosemary promoted clarity and decreased test anxiety without the relaxing effects of lavender.

While Kavurmaci, Kucukoglu, and Tan (2015), did not show improved academic performance, their study showed a significant decrease in test anxiety of nursing students prior to a test. Three drops of lavender oil were applied to a non-absorbent cloth and placed 15-20 cm distance from the nose of each student. The students were exposed to the aromatherapy for 15 minutes prior to taking the exam. Students in the control group were taken to a different test room. The STAI 1 form was completed after a 15-minute exposure to the aromatherapy. The STAI 1 scores were significantly lower in the experimental group compared to the scores in the control group ($p>0.05$). The researchers advised that nurse educators should use aromatherapy as an educational strategy to decrease test anxiety. The results of this study can be used as a guide for educators to try lavender aromatherapy to decrease test anxiety.

Çevik, İnce, Ayceman, and Ergin, (2017) wanted to explore if orange and lavender aroma decreased the anxiety of nursing students experiencing their first blood draw practice.

Aromatherapy was distributed with a diffuser at five minute intervals consisting of one drop of lavender oil and one drop of orange oil mixed in 100ml of distilled water. After the implementation of aromatherapy, the experimental group showed no significant decrease in their anxiety level scores, VAS ($p>0.05$) and STAI ($p>0.05$). However, the study recognized that others had successfully used aromatherapy for decreasing anxiety. Since there are conflicting results from previous studies, it is recommended that more research be conducted with a larger sample size, and various oils and aromatherapy methods. In reading the procedure for this study, it can be deduced that the time of exposure was not appropriate for decreasing anxiety.

According to the findings of a study by Kim (2010), aromatherapy inhalation partially verified the reduction of anxiety levels among nursing students practicing their first intravenous injection. Three diffusers containing one drop each of lavender, roman chamomile, bergamot, and geranium were used in a 193cm/3 classroom. The diffusers were placed in each corner of the classroom only the experimental group was exposed to the aroma from the diffusers for one hour. “Educators in the nursing field should recognize this fact and consider developing strategies that can reduce nursing students’ anxiety” (Kim, 2010, p.7). This study supported the efficacy for the use of aromatherapy to decrease test anxiety, however, more studies to support the use of aromatherapy are recommended.

The researchers of this study compared two essential oil aromas, lavender and citrus, on anxiety among female students Bakhsha, Yousefi, Aryaee, Jafari, and Derakhshanpoor (2016). The Sarason Anxiety Test was used to measure anxiety before the intervention of aromatherapy and the Visual Analogue Scale was used to measure anxiety after the intervention of

aromatherapy. It was found that both aromatherapy groups had a significant decrease in anxiety levels ($p < 0.001$) after the intervention of aromatherapy as well as a significant decrease heart rate.

The strength of this study was found in the implementation of aromatherapy to reduce anxiety in diabetic children. Orange essences were chosen for this study to determine its anxiolytic effects on Iranian school-age children with diabetes Sharifi, Motaghi, Borji, and Moradi, (2017). Sixty children met the criteria for participation in the study, and informed consent was obtained. A significant decrease in the anxiety levels of diabetic children was noted in the experimental group after the intervention of aromatherapy. The researches pointed out that the aromatherapy was done by parents and children, not by the researchers themselves. At the conclusion of the study, the researchers suggest that the non-pharmacological orange aroma should be used for the treatment of anxiety in school-age children with diabetes. Aromatherapy has less adverse reactions and risk as a treatment for anxiety in children than a pharmacological treatment.

The essential oil derived from lavender is known for its parasympathetic effects leading to decreased anxiety, improved disposition, and tranquility Zabirunnisa, Gadagi, Gadde, Koneru, Myla, and Thatimatla (2014). In the control group consisted of 310 dental patients, and 287 dental patients were in lavender aromatherapy group. T-test was performed to analyze the data using SPSS. The anxiety scores were statistically lower in the lavender aromatherapy group ($p = 0.001$) than in the control group. According to this study, lavender was an effective intervention in reducing dental anxiety. This can be effective to on patients whose dental anxiety is below the level of phobia. According to this study, more research is recommended for the effectiveness of aromatherapy in reducing dental anxiety Zabirunnisa et.al. (2014).

Lavender was used for this study of coronary angiography patients at Fatemeh-Zahra Hospital in Iran Tahmasbi, Mahmoodi, Mokhberi, Hassani, Akbarzadeh, and Rahnamai (2012).

In a pot with ten milliliters of distilled water, two drops of lavender were dropped on cotton balls. The experimental group was instructed to keep the cotton ball at least five centimeters from their nose and to sniff for three minutes. After 30 minutes, vital signs were collected and the STAI form was completed. The control group followed the same procedure using only distilled water. There was a significant decrease in anxiety after the intervention of aromatherapy for the patients waiting coronary angiography ($p < 0.05$). The results of this study showed that aromatherapy can be used to decrease anxiety and vital sign parameters before coronary angiography.

Nursing interventions to decrease anxiety and improve sleep quality in an intensive care unit would prove beneficial to cardiac patients. Cho, Min, Hur, and Lee (2013) explored the effects of aromatherapy use on anxiety and sleep quality of percutaneous coronary patients in an intensive care unit with ischemic heart diseases and stent placement during coronary angiography. There were 28 patients in the aromatherapy group and 28 patients in the control group. Lavender, roman chamomile, and neroli blended aromas were applied to an aroma stone. The patients were instructed to take 10 deep breaths prior to the Percutaneous Coronary Intervention (PCI) procedure and after. The stone was then placed under the patient's pillow. Although the goal of the study was to reduce anxiety levels the authors noted that the use of aromatherapy made significant decreases in blood pressure and improved sleeping conditions for the PCI patients in the ICU. There was a significant reduction in the VAS scores in the aromatherapy group compared to the control group ($p > .001$). The study recommended further research of aromatherapy as an appropriate nursing intervention in potential clinical practice.

Summary of Literature Review

Test anxiety is a form of an anxiolytic state that occurs prior to a test. Anxiety effects cognitional recall and memory which has a negative influence on student's academic performance. Students are harmed by test anxiety because it lessens their motivation for academic success. Decreasing test anxiety can improve academic performance. Research studies have shown aromatherapy to decrease anxiety in various environments, including the anxiety felt prior to a test. Nurse educators have a responsibility to facilitate strategies that will help decrease test anxiety. The review of literature supported the use of aromatherapy to decrease nursing student text anxiety. Equally important with the review of literature was the serendipitous finding that aromatherapy is beneficial in other stress producing situations.

Chapter III

Methodology

This study will use mixed-method design. The methodology is an integrated qualitative and quantitative designs to strengthen the breadth and depth of the data, and provide a better understanding regarding student test anxiety. Mixed methods also facilitate nursing faculty in extracting inferences regarding test anxiety strategies. Qualitative phenomenology is used to better understand the lived experience of the student experiencing test anxiety. It is concerned with discovering unknown facts about a phenomenon. The quantitative design will use a correlation randomized approach. Data analysis in discovering the effect of aromatherapy (citrus lime/lemon) essential oil on fundamental nursing student (FNS) test anxiety may facilitate generalizing the findings across the population of test- taking students.

A pilot research study will be conducted during the fall 2017 semester, and will consist of no more than 10 FNS. Inclusion criteria include male and female students age 18-21, and who are considered traditional FNS first semester. Exclusion criteria include students older than age 21, students who have been previously enrolled in Southern Adventist University or other

nursing programs, and those who have olfactory dysfunction or currently using histamines, or are currently taking antianxiety medications. The participants were volunteers and conformation of consent was conducted by random selection until 10 had confirmed. The participants were free to opt out of the study at any time. After the pilot is conducted and analyzed, the actual research sample recruited will be 20-30 students.

Chapter IV

Results and Discussion

The research assistant for this study did a review of literature by reviewing literature pertinent to the research paper. The literature review revealed the significant results of using aromatherapy to decrease anxiety. The Institutional Review Board (IRB) was submitted along with the design of the study and the anxiety questionnaire used for study. A power point was presented to explain the purpose of the research pilot study to the FNS class. The collection and data will be entered using SPSS for analysis. The data collected thus far are from five test exams from the (FNS). There are two remaining test that will be collected to conclude the pilot study.

Results

Quantitative results demonstrated no significant findings at this time. The results of the qualitative findings were as follows:

| | Pre-Test Anxiety Mean | Post-Test Anxiety Mean | Pre-Test Score Mean | Post-Test Score Mean |
|--------------|-----------------------------|------------------------------|---------------------------|----------------------------|
| No Treatment | 1.88 | 1.88 | 50.2 | 51.6 |
| Treatment | 1.88 | 1.75 | 52.6 | 52.6 |

In addition Cohen's *d* and the effect-size correlation were negative, meaning that movement was in different directions with no relationship to each other. Effect size was calculated using the means and standard deviations of the two groups (treatment and control).

The effect size represents the magnitude of the relationship between the research variables.

Having a negative effect is significant because it is a strong indicator of influence.

Aromatherapy pre-test themes which emerged: “Calm, relaxed, easy to remember”, “Optimistic, relaxed, calm”, “No difference, relaxed but semi- sleepy, relaxed but not enough due to circumstances high anxiety.”

Aromatherapy post-test themes which emerged: “Relaxed, concentrate, breathe easier, slow down to think”, “Calm, and relaxed”, “Faint smell, needed to be stronger” and “No difference”.

Discussion

Despite the limitations to the pilot research study, there is room for further research and modifications in the replication of the study. The measurement tool form was created off of several anxiety questionnaires, therefore, the reliability of the tool was weak and without validity. Therefore, the use of an anxiety measurement tool with credibility would be implicated. In addition, the research pilot sample size was small. The research with a larger sample size increases reliability. None the less, a question of the placebo effect of the students thinking the use of aromatherapy would improve their test scores would continue to be a factor. Not to mention if the students improved their study habit routine for example: A SAP/ tutoring, individual ways the student studied, study groups, devoted more time in test preparation, and spiritual preparation (prayer).

Chapter V

Evaluation

Discussion of Learning and Experience

Exposure to the plethora of knowledge in the research process has been enlightening and rewarding. The role of the research assistant is crucial and required passion and commitment. The responsibility of the research assistant contributed to a better understanding of nursing research in clinical and educational practices. The author of this paper as transitioned from a casual aromatherapy knowledge to an evidenced base practice and advocate.

Application for Advanced Practice Nursing

As patient advocates and educators, advanced practice nurses are accountable to offer evidenced based resources for the intervention of anxiety. Aromatherapy has far reaching implications for the in-patient and outpatient settings, such as: ICU's and dental offices. Interestingly, other research has been conducted using aromatherapy to decrease anxiety in diabetic children in the home.

Because aromatherapy is so widely used, knowledge of aromatherapy properties, uses, and contraindications is essential. For example, it is theorized that aromatherapy could be included as part of a treatment plan and assessed for use in patients who experience anxiety.

Recommendations for Further Study

The research by Johnson (2014), recommended the use of lemon aromatherapy as a successful strategy to decrease test anxiety and improved the cognition of nursing students. She suggested that educators use strategies to decrease test anxiety in a highly stressful program. In addition, the research by Bakhsha, F., Yousefi, Z., Aryaee, M., Jafari, S. Y., & Derakhshanpoor, F. (2016), reported the use of lavender essential oil aroma and Citrus aurantium aroma, decreased the levels of anxiety among university female students. The researchers added the use of aromatherapy was a

cost effective intervention in reducing anxiety with little side effects. Aromatherapy in other academic settings is warranted for assessing aromatherapy benefit with cognitive test anxiety.

Mi-Yeon Cho, Eun Sil Min, Myung-Haeng Hur, & Myeong Soo Lee. (2013) used aromatherapy to decrease the anxiety of patients undergoing percutaneous coronary intervention in intensive care settings. The outcome was positive with a noted decrease in vital sign, lowering of expressed patient anxiety, and an improvement in their sleep was noted. A recommendation for the clinical setting is to explore family anxiety in waiting rooms and aromatherapy effect, potential impact on healthcare staff anxiety and stress during their shift, and lastly, minimizing offensive or unpleasant patient body odors which can heighten family stress and anxiety.

Zabirunnisa, M., Gadagi, J., Gadde, P., Koneru, J., Myla, N., & Thatimatla, C. (2014) administered aromatherapy in the waiting room of dental offices to decrease dental anxiety among patients prior to visiting the Dentist. Further study is justified for the practical purpose of reducing overall fear of the dentist office and related procedures.

Research conducted by Sharifi, A., Motaghi, M., Borji, M., & Moradi, M. (2017) discovered that the effects of orange aromatherapy decreased diabetic children's anxiety. Future research could be done using a school classroom exploring how this could lessen diabetic children's stress and anxiety levels as they learn to cope with this disease process.

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